Ongoing GIS Initiatives Since May of 1999

Over the past 3 years there have been involved in a series of ongoing GIS initiatives. These mainly fall under auspices of WAGIC and Transportation Framework Initiatives as well as a deep involvement in the IRICC (Inter-Organization Resource Information Coordinating Council) process. There has been a tremendous amount of good work done through these different efforts.

The following is an attempt to summarize these sometimes parallel efforts and to draw conclusions and comparisons between them. I'd like to start out by defining the different groups and providing links to their respective web sites when available.

GIS Organizations/Committees

1. WAGIC[1]: The Washington Geographic Information Council
    1. [1]http://www.wa.gov/gic/
    2. Transportation Framework Subcommittee
    3. The Ad hoc WAGIC Strategic Planning Committee

2. IRICC[2]: Inter-Organizational Resource Information Coordinating Committee
    1. http://www.iricc.org/index.html[2]

There are other initiatives that are concurrent with the above that I have only been tangentially involved. These include the FRAMEWORK Management Group, a sub-committee of WAGIC, as well as a newly established WAGIC Executive Committee on GIS organized under the ISB.

The WAGIC Transportation Framework Strategic Planning Committee[33]

This committee under the facilitation of George Spencer of the WSDOT Cartography and Mapping Lab, started in early June of 1999 and concluded its main objective in January of 2000. This objective was the Transportation Framework Charter.

We met monthly over that time period and usually provided a video conference uplink to other sites around the State of Washington. This was a fairly broad based and diverse group with members from Federal, State, Local as well as the Higher Education community.

During the months we met, the group worked out a document that became the Transportation Framework Project Charter. It was finalized in January of 2001 and then submitted to the FMG (Framework Management Group) and WAGIC for review and comments. This document became the working outline for the Transportation Framework initiative.

One of the main goals of the Plan was to move the Transportation Framework forward. In so doing a number of steps were outlined in the charter that would help define what the Key Deliverables and the Outcomes and Measure that should result. These were identified in the original Charter as falling under two distinct categories: Project Deliverable and Management Deliverables.

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[1] Washington State Geographic Information Councit: http://www.wa.gov/gic/
[2] Inter-Organizational Resource Information Coordinating Committee: http://www.iricc.org/index.html
[3] Wahington State Transportation Framework Project:
http://www.wsdot.wa.gov/gis/transframework/default.htm

Project Deliverables:

1. Business Needs
2. Business Requirements
3. Cost Benefit Analysis
4. Functional Requirements
5. Data Model
6. Database
7. Data Access and Distribution
8. Data Integration Standards
9. Partnership Agreements
10. Definition of Roles
11. Pilot Project to Populatethe database
12. Plan for Maintaining the Transportation Framework
13. Project Reports

Management Deliverables:

1. Develop Decision Package and Funding
2. Establish Formal Project Reporting and Decision Making Structure
3. Project Charter
4. Risk Assessment and Management Plan
5. Communication Plan
6. Change Control Plan
7. Issue Management Plan and Dispute Resolution
8. Project Plans
9. Project Mini-charters

The outgrowth of these two sets of deliverables have resulted in both a number of direct and indirect initiatives to the Transportation Framework efforts. Perhaps most important to these initiatives was the official teaming with the Inter-Organizational Resource Information Coordinating Committee, or IRICC.

IRICC

The **Interorganizational Resource Information Coordinating Council** (IRICC) was established as a subcommittee to the Intergovernmental Advisory Committee (IAC). IRICC was charged with developing a seamless, current, and accessible information network to support ecosystem management in support of the Northwest Forest Plan, the Endangered Species Act, National Environmental Policy Act, Clean Water Act, Federally Reserved Rights, and other applicable direction pursuant to ecosystem management in Northern California, Oregon, and Washington.

Washington Framework efforts approached IRICC cautiously in the beginning, but, as it seemed there were parallel tracks being laid down, it made sense to engage in a dialog with this group. With the ongoing efforts being made by the FGDC as well as the National GeoData Center, it was sensible for Washington to look at what else was happening under the auspices of Transportation Framework initiatives.

As a result of the TFWK's efforts in putting together the Project Charter, it's inclusion in the IRICC process and our search for a model to follow, a decision was made to look closely at what approaches were available for the Framework to follow. It was evident that there were many paths that could be pursued, one of which was the IRCC model. But, this was not the only approach. We needed to know more about what else was available. This effort was most headed by Ron Cihon and was an attempt to educate the Project Charter Team on what kinds of

GIS approaches we could use to begin building "A Collaborative and Component Based Approach to Building Transportation Framework for Washington".

The outline of the process we wanted to follow was that beginning in early December of 2000, the Charter participants would begin a process of education as to what a transportation framework would look like. We developed a model that attempted to define the framework as being component based:

The Component Based Model

1. The framework is a comprehensive road network
2. Must have the ability to assign attributes to the road network
3. Must have the ability to associate other transportation objects or features to te road network and its attributes
4. There must be institutional arrangements that will make it all happens

The question was, of course, how does one go about creating such a tool? We had been exposed to the IRICC approach. What other approaches were there? A list of approaches were developed by Ron Cihon and it was determined that the Charter Participants should look at the various approaches and attempt to assess the approach or approaches that would fit our needs the best.

The Approaches to a GIS Transportation Framework Model

1. The Bundled Approach (IRICC)
2. The Modified Bundled Approach (Public/Private Partnership)
3. The Unbundled Approach (NSDI – FGCD)
4. The comprehensive data model approach (UNEtrans)
5. Internet/ Agent Approach

A Bundled Approach (IRICC)
(http://www.iricc.org/)

As stated in the original charter, the vision of a Transportation Framework is to create a seamless set of data that is consistent, connected and continuous between segments of the transportation framework and other framework layers. It represents the best data available and includes mechanisms to improve it over time. And finally, the framework data should be accessible to the general public at the least cost with the least restrictions.

This approach is to re-construct a centerline map from a variety of participants…local, state, federal, tribal and then assemble a core map with core data that provides the essential transportation framework components. This type of approach is sometimes referred to as a "Bundled Approach". Bundled, because the data is a collection of information garnered across agencies, and then conflated to fit at edges and jurisdictional boundaries and then held in a Central Clearinghouse where additional QC and QA are preformed and eventually, the data is made available through the internet.

A Modified Bundled Approach (GDT)
(http://www.geographic.com/home/index.cfm)

The charter group invited both ESRI and GDT (Geographic Data Technology) to present their vision of a Public Private partnership that would fulfill the needs of a transportation framework. Mr. John Auble of GDT and Chris Wayne of ESRI gave the group a presentation of their teamed collaboration called Community Update. GDT is a private sector mapping company that provides ITS (Intelligent Transportation Systems) for various transportation interests around the country.

This includes everything from rental car companies to transit and delivery companies. Under this vision, GDT is the steward of the data. The partners to the Community Update provide the information and GDT maintains the data in a central clearinghouse and it is distributed via the web to the participating partners.

The Unbundled Approach (NSDI)
(http://www.fgdc.gov/nsdi/nsdi.html)

Next on the list is the Unbundled approach. This is the NSDI (National Spatial Data Infrastrucure) which is the Federal Government's set of guidelines for the development of a National Road Network database. The premise here is that the Feds are not going to make a National Transportation Framework, but that it will come out the efforts of local and state agencies, which already have the best available data anyway.

The unbundled approach favors a decentralized distributed set of data guided by the principle set down in the NSDI standards. Without a guiding set of standards there can be no interoperability between datasets or geographic areas and no interoperability between different users even within the same geographic area. And the opportunity for massive data redundancy of course is extremely high.

The Comprehensive DataModel Approach (UNETrans – ESRI)
(http://arconline.esri.com/arconline/datamodels_one.cfm?id=14)

The UNETrans approach, or the UNIFIED NETWORK-TRANSPORTATION DATA MODEL, provides a comprehensive transportation data model construct. This construct is part of an ongoing effort by ESRI to create a data model application that will focus on the needs of organizations that manage transportation networks. The intent is not to create a new set of standards but to provide a useable Transportation GIS Model that will:

- Simplify enterprise project implementations
- Encourage consistency in data structures to facilitate data sharing
- Provide a common starting point for application devlopers

Internet/Agent Approach (ESRI Network Geograhpy)
(http://www.geographynetwork.com/data/tiger2000/)

Of all the approaches we looked at this one perhaps held the most intriguing promise…but was also the one in its utmost infancy. ESRI presented a vision of what a internet centric "mined" geographic information system could look like using their Network Geography as the model. In this scenario, it is assumed that the information exists in cyberspace and simply needs a point of consolidation to come together.

- Contributors to the Network post links to their data sties
- Publishers put up data and map services
- Partners host map services and are commercially involved with the Geography Network
- All broadcasters post standard-format metadata.

Approaches Summation – What we learned

After looking at the different approaches, it became clear that each brought value to the table. But perhaps no single approach was structured to succeed on its own. Each had its merits…as well as its complications. To break it down, we looked at the strengths and weaknesses of each approach:

IRICC – GDT and the Bundled Approach[4]

The inherent strength of the IRICC approach is one that provides a centrally located clearing house where collected and submitted data can be vetted and quality control can be provided. A set of metadata standards can be applied up front that are used to establish the validity and accuracy of the data. This is also the value of the GDT approach where again, a centrally located clearinghouse is the waypoint for the collected data.

However, that being said, in both cases, the clearinghouse is also the weak point…or at least the intersection of the challenges to proceeding in this manner.

In the case of IRICC, a centralized clearinghouse means the necessity of having an organization in place that fulfills that role. A GIS steward housed either with some organization or agency that accepts that role. In the case of government, that would mean a new agency that would be the State GIS Clearinghouse. And therein lies the rub. Currently there is no agency that has been given that responsibility. If there was, it would provide local governments with cause for concern of having unfunded mandates to provide and support the building of framework elements.

In the case of GDT, a private company holds the keys to the clearinghouse. One of the basic tenets of the charter is to provide as wide of access as possible. Under a Private/Public partnership the challenge of access and licensing is always present.

In both cases there are also technical issues that need to be overcome to achieve a modicum of success. These include, but are not limited to transactional updating and update frequencies.

NSDI - The Unbundled Approach[5]

The strength of the NSDI approach is its realization that the best data is held at the local levels and that currency and accuracy can best be obtained there. The establishment of guidelines to provide a structure around which a framework can be constructed also is a strength. However, the institutional barriers and the complexity of a wide area distribution network both pose large hurdles to fulfilling the promise of a Transportation Framework. In addition, absent a centralized technical thread, or authority, gaps in coverage cannot be addressed.

UNETrans – The Comprehensive DataModel Approach[6]

This approach defines the model, but does not address how the data model is built. As a construct it casts a wide net and builds a model that attends to almost every transportation element. However, this will not get the Framework built.

Internet/Agent Approach

Unfortunately, this approach, for all its promise is not yet positioned to fulfill its potentiality. The web is not quite at the point where it can be an effective tool for the complex distribution of data

[4] Geographic Data Technology: http://www.geographic.com/home/index.cfm
[5] National Spatial Data Infrastructure: http://www.fgdc.gov/nsdi/nsdi.html
[6] UNETrans: http://www.ncgia.ucsb.edu/vital/unetrans/

from distributed sources. However, there are exciting possibilities that exist for serving end users with the data and this is the path that this approach should prove the most useful on.

IRICC

Having put to the test the approaches and educated ourselves as to the strengths and weaknesses each could bring to the table, the core charter members decided to engage more fully with the IRICC team. There were many reasons to pursue IRICC, not the least of which was the strong Federal presence that existed there as well as being able to build upon the work that IRICC had already accomplished.

As we engaged with this group, it became evident that there were many points of intersection that fit each groups goals. IRICC's charter states:

*The **Interorganizational Resource Information Coordinating Council** (IRICC) was established as a subcommittee to the Intergovernmental Advisory Committee (IAC). IRICC was charged with developing a seamless, current, and accessible information network to support ecosystem management in support of the Northwest Forest Plan, the Endangered Species Act, National Environmental Policy Act, Clean Water Act, Federally Reserved Rights, and other applicable direction pursuant to ecosystem management in Northern California, Oregon, and Washington.*

IRICC was also in the process of developing the framework layers, including transportation. This gave impetus to the Washington Framework Groups inclusion in their efforts.

The IRICC White Paper[7]

In mid 2001, with the funding assistance of the USGS and input from IRICC, the joint group comprised of Framework charter members and the IRICC working group, entered into an agreement with Kenneth J. Dueker of Portland State University to put together a White Paper whose purpose was to discuss the Issues and Strategies for Building a State Transportation Framework. This was accomplished through a grant from the USGS and was done for IRICC and the Washington State Transportation Department. Over the ensuing several months, Mr. Dueker provided the group, through an iterative approach, a working document that addresses the next steps to bring a Transportation Framework to fruition.

This white paper discusses the next steps to undertake to implement a Transportation Framework. The white paper builds on the work done with IRICC, The Washington Transportation Framework Charter, as well as the USGS, USFS, BLM, and the Washington and Oregon Transportation Departments. It provides a blueprint to follow and suggests a step by step approach to launching a Transportation Framework, including Pilot Project alternatives and business needs approaches.

The Dueker paper takes a "Bundled" approach methodology and looks at models that are in process in other states, drawing on those experiences and the needs of Washington to provide a "framework" from which to construct a Framework.

[7] Strategies for Building a Transportation Frameworkhttp://www.wsdot.wa.gov/gis/transframework/TFwpFINALApril.pdf, Dueker, et al, 2002

Other Ongoing Initiatives

The GEOData Alliance (http://www.geoall.net/)[8]

In 2002 Washington's WAGIC became a member of the GeoData Alliance. The Alliance is a coalition of organizations who are all striving toward creating an open and inclusive community to foster trusted and inclusive processes to enable the creation, effective and equitable flow, and beneficial use of geographic information. As a participating Institutional Member, WAGIC gains access to a wide network of other organizations that are on similar paths. This provides a network of information and experience that can be used to add substance and flavor to our own efforts.

2001 Strategic Planning Activity[9] (http://www.wa.gov/gic/Plan01/2001_strategic_planning_activity.htm)

In concert with the ongoing Framework efforts, the Washington Geographic Information Council (WAGCI) initiated an update of the Strategic Plan for GIS in the State of Washington. In late March of 2001, a group of people representing a diverse selection of organizations met in Ellensburg to update the WAGIC strategic Plan for GIS in Washington. The result of this updated plan was a call for the completion of a Digital Framework for the state of Washington, including:

- Hydrography
- Transportation
- Cadastral
- Ortho-Imagery
- Topography
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Current efforts are focused on Ortho-Imagery and securing long term funding for WAGIC.

Conclusions

These are but a few of the ongoing efforts being pursued at both the Framework and the larger GIS community level in the state of Washington. Many of these are parallel tracks and much time and effort has been expended in bringing these initiatives to bear. An ongoing theme that threads through all of the described initiatives is to continue to work on the Framework initiative and to complete a digital Framework for the State of Washington.

It is my view that the work already done has created a tremendous body of information that needs further analysis and compilation to create a seamless overview of the strategies and efforts that have been completed. I believe there is a significant amount of work that has been done that has yet to be fully appreciated and or acted upon. The re-invention of this work is a Sisyphean task that serves little purpose. I believe that an effort to consolidate the work that has been accomplished is the best way to move forward in an expeditious manner at this time.
Too much good works exists for it to be set summarily aside in favor of another flavor of the month. This is not to say that there are not methods or ideas out there that are not worth looking at…in fact when a viable model presents itself, certainly it should be carefully reviewed as to it applicability to our efforts here. However, that being said, I believe the Dueker paper lays out a legitimate course of action to begin the implementation of a Washington Transportation Framework.

[8] GeoData Alliance: http://www.geoall.net
[9] 2001 Strategic Planning Activities: http://www.wa.gov/gic/Plan01/2001_strategic_planning_activity.htm

Dueker's paper provides an overview of:

1. Who's doing what, where, in the Transportation Framework arena,
2. An assessment of Business Needs
    a. Emergency Management
    b. Salmon Enhancement
    c. Infrastructure Management

The Dueker paper provides a roadmap on how to get from where we are to where we want to be. In my view, to not use this work would be a step backwards and erect additional barriers to completing the framework. It is time we put aside analysis and make a leap into being proactive.

Additional Resources

Federal Geographic Data Committee	**http://fgdc.er.usgs.gov/**
National States Geographic Information Council	**http://www.nsgic.org/indexframe.html**
Oregon Spatial Data Clearinghouse	**http://www.sscgis.state.or.us/index.html**
Thurston County GeoData Center	**http://www.geodata.org/**
USGS National Mapping Information	**http://mapping.usgs.gov/**